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suggested by the Examiner.

Applicant now amends the claims to specifically completely eliminate (exclude) the ethylene oxide condensation and esterification add-on compounds of Wenzel, et al. '698 in all claims.

EXAMINER'S INTERVIEW

Applicant and Applicant's undersigned Attorney of Record want to gratefully acknowledge the helpful telephone interview with PTO Examiner Jerry Johnson on June 26, 2001. The content of that interview is found in the amendments to the specification and to the claims above and in the statements and arguments below.

TEXT ADDED TO THE SPECIFICATION

Applicant asserts that the newly added text for the complete elimination (exclusion) of the Wenzel, et al. compounds containing ethylene oxide condensation and esterification products is sufficiently supported in the application.

Applicant cites Wenzel, et al. U. S. Patent 4,083,698 in the specification on page 6, lines 3 to 10. (i.e.).

"E. Wenzel et al. in U.S. Patent 4,083,698 disclose a clear, stable liquid fuel composition for internal combustion engines. The fuel composition comprises a water-in-oil (w/o) emulsion of (a) a hydrocarbon fuel, (b) water, (c) a water-soluble alcohol and a combination of surface active agents, which are stable emulsions over a wide range of temperatures. However, in all described aspects, a non-ionic surfactant is a necessary component of the additive. In all described aspects this non-ionic surfactant includes an ethylene oxide (now added), polyethylene oxide, (now added) polyoxyethylene and/or polyoxypropylene addition product." (This addition of oxide is supported by examination of Wenzel '698.)

All U.S. patents are incorporated by Applicant by reference in their entirety on page 7, lines 12-13: (i.e.).

"All patents, patent applications, articles, references, standards, etc. cited herein are incorporated by reference in their entirety."

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Thus, under the text and ruling of the Manual of Patent Examining Procedure, Section 608.01 (p), Applicant is permitted to add specific text and subject matter as **essential material** to the present application and to the claims which is taken directly from an issued U.S. Patent, such as Wenzel, et al. '698.

Therefore, as seen above on page 2, Applicant has added to page 6 text from Wenzel, et al. '698, from column 3, lines 30-38. This text describes the unique and novel combination of Wenzel, et al. '698 concerning the surface active agents. Section (3) in this text specifically describes "non-ionic surfactant" which is typified by ethylene oxide condensation products.

Applicant next on page 3 above adds by amendment and incorporates by reference text from Wenzel '698 column 4, lines 7 to 63 to page 6 of Applicant's specification. This text follows the just above incorporated by reference text and describes in further detail the ethylene oxide condensation products of the Wenzel, et al. '698 patents, which product are also described as non-ionic surfactants. Applicant has used the term "non-ionic surfactants" in the specification (see for example, page 6, line 7 which describes the non-ionic surfactant of Wenzel, et al. '698, and page 40, line 18 is described as an ethoxylated non-ionic surfactant).

Applicant in the Field of the Invention on page 2, lines 16 to 22 states:
Specifically the additive composition includes one or more of the following: aqueous or anhydrous water-soluble alcohols and includes optionally one or more of the following: water-insoluble alcohols; ethoxylated alcohols; and fatty acids partially neutralized with a volatile source of basic nitrogen, while specifically limiting the use of ethylene oxides and specifically excluding conventionally used glycerine, esterification products, metals, non-biodegradable solvents, and certain other components.

Note that Applicant expressly excludes esterification products for the additive fuel composition. Esterification products are those of the type described by Wenzel et al. '698 and now expressly excluded.

Applicant also discusses again the patent: Wenzel, et al. '698 on page 45, lines 20 to 30. (i.e.).

"Prior art, such as Wenzel et al, US Patent 4,083,698, successfully produces stable microemulsions with water and methanol, but utilizes high concentrations of non-ionic surfactants with 5, 7, 9 and up to 20 moles of ethylene oxide, or polyethylene,

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polyoxyethylene, or polyoxypropylene molecules. While these create stable microemulsions, viscosity is adversely affected, producing compositions that are more viscous than Diesel fuel, which poses potential problems in adequate fuel flow during use in an engine.

The above ethylene oxide (now added), polyethylene oxide (now added), polyoxyethylene, or polyoxypropylene add-ons are also largely incombustible, which poses the immediate problem of increased exhaust smoke when not specifically limited or eliminated entirely from compositions for use as fuel."

This text reflects the problems of the additive components which compounds having ethylene oxide add-on groups. The text at page 45, lines 27-30 indicates that THESE ETHYLENE OXIDE ADD-ON COMPONENTS ARE TO BE ELIMINATED COMPLETELY (EXCLUDED) FROM COMPOSITIONS FOR USE AS A FUEL.

Applicant has also above incorporated by reference text from Claim 14 of Wenzel, et al. '698 column 30, line 49 to column 32, line 7 into the specification. This text defines again the ethylene oxide condensation product as an ethylene oxide product.

Based on all of the above discussion, Applicant argues that the above ethylene oxide add-on compounds of Wenzel, et al. '698 are to be COMPLETELY ELIMINATED (excluded) from Applicant's compositions for use as a fuel in the present invention. The text incorporated from Wenzel, et al. '698 into the specification only serves to further explain and describe the present invention - which excludes the recited compounds having ethylene-oxide add-ons.

Applicant now encloses page 369 from the Webster's New Collegiate Diction published in 1976. The word "eliminate" has as one of its synonyms the word - - exclude - -.

APPLICANT ASSERTS THAT NO NEW MATTER IS ADDED TO THIS APPLICATION.

In independent Claim 1, the text describing the completely eliminated ethylene oxide add on compounds from the fuel composition which was incorporated by reference on page 45, line 23. Therefore, the specific text for subpart (d) and its new amendment are found directly in the specification. No new matter is added to the application.

Applicant therefore has amended all the claims to specifically eliminate (exclude) ethylene oxide add-on compounds in all claims.

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The support for the amendment is found throughout the application - See page 21, lines 10 to 14 which discuss the fact that ethylene oxides of 5 or larger add-on are not useful. Also see the SUMMARY OF THE INVENTION on page 8, lines 7 to 16 where the entire ethylene oxide component is optional. (Also see originally filed claim 1) By combination of these texts, the ethoxylated alcohols having an ethylene oxide add-on of greater than 5 moles is not present or useful in the present invention. Optional means according to the dictionary, not compulsory. Therefore, the composition will perform within the invention with or without any ethylene oxide add-on present. IN THE PRESENTLY AMENDED CLAIMS, ETHYLENE OXIDE ADD-ON COMPOUNDS ARE ELIMINATED (EXCLUDED).

This application has many examples. In Example 1 TERGITOL 15SS3 is present where the ethylene oxide add-on is 3. However, there is no components having ethylene oxide add-on groups present in Examples 2(a), 2(b), 2(c), 2(d), 2(e), 2(f), 2(g), 2(h), 2(i), 3(a), 5(a), 5(b), 5(c), 5(d), 5(e) and 7(a) to 7(g). Thus Applicant asserts there is sufficient support in this application as filed to exclude, all ethylene oxide add-on components.

SPECIFICALLY,

Claim 1 now excludes the ethylene oxide add-on compounds.

Claim 59 is now amended to exclude ethylene oxide add-on components. This claim should now be allowed.

Claim 60, 61, 62 and 63 are now dependent on claim 59. AS A GROUP THESE CLAIM WATER PRESENT IN SUBPART A(II) UP TO 5%. These claims should also be allowed.

Claim 64 is now amended to exclude organic ethylene oxide add-on compounds and should now be allowed.

Claim 65, 66, and 67 are now dependent on claim 64. AS A GROUP, THESE CLAIM WATER PRESENT IN SUBPART A(II) UP TO 10%. These claims should also be allowed.

Claim 68 is now amended to exclude organic ethylene oxide add-on compounds. This claim should be allowed.

Claim 69 and 70 are now dependent on claim 68. AS A GROUP, THESE CLAIM WATER PRESENT IN SUBPART A(II) OF 10 TO 25 % and should be allowed.

Claims 78 and 79 depend on claim 1 and claim a specific set of ratios.

Claim 80 and 81 now depend on claim 59 and claim a specific set of ratios.

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Claim 82 and 83 now depend on claim 64 and claim a specific set of ratios.

Claim 84 now depends on claim 68 and claims a specific set of ratios.

APPLICANT GRATEFULLY ACKNOWLEDGES THAT STEINMANN 6,017,368 AS
A REFERENCE HAS BEEN OVERCOME AND IS NO LONGER CITED.

No new matter has been added to the application.

EXAMINER'S POSITION

Claim 65, 69 and 72 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

RESPONSE: Applicant has rewritten these claims in independent form as suggested by the Examiner. Further, other pending claims have now been made dependent on these claims. Therefore, this objection should be overcome and these claims should be allowed.

Claim 61 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, second paragraph, set forth in this Office Action and to include all of the limitations of the base claim and any intervening claims.

RESPONSE: The offending phrase has been removed and this claim is also now in independent form and should be allowed.

THE PRESENT INVENTION

A summary of the present invention teaches a combustible fuel composition of diesel fuel and additive is a clear microemulsion, wherein the additive comprises:

- (a) ethanol;
- (b) alcohols having between 3 and 5 carbon atoms, or having between 6 and 12 carbon atoms, or both;
- (c) a fatty acid in combination with aqueous or anhydrous ammonia or urea
- (d) excludes any ethylene oxide add-on compounds (specifically those described by Wenzel et al '698); wherein components a, b, c, and optionally d as the additive when combined with mixing with diesel fuel form a clear, stable microemulsion fuel composition. Actually subpart (d) is excluded in this embodiment.

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When water content is very low, an effective, stable microemulsion fuel composition can be produced using diesel fuel and only the following:

- a. aqueous ethanol,
- b. alcohols having 3-5 carbon atoms
- c. fatty acids neutralized with ammonia and/or urea,

Applicant asserts that the present minimally-produced additive formulation is an important improvement over prior art because it incorporates all of the essential components that lead to improved combustion of diesel fuel:

1. water (added or ambient condensation) for optimal combustion temperature,
2. ethanol for oxygen content and more complete combustion,
3. iso-propanol for improved stability (formulations with only ethanol and neutralized fatty acid did not remain stable over time),
4. neutralized fatty acid as the primary surfactant forming the microemulsion; and does not include any (d) components that are prohibitively expensive, impede combustion, increase fuel consumption, or increase exhaust pollution, such as esterification products, ethylene oxide add-on compounds or [acetylenic diols as taught by the prior art] high-mole ethoxylates as taught by Wenzel et al USP '698.

APPLICANT COULD FIND NO ART IN THE OPEN OR PATENT LITERATURE THAT INCLUDED ETHANOL, COSOLVENTS C3 TO C12 ALCOHOLS AND PARTIALLY NEUTRALIZED FATTY ACIDS FOR DIESEL FUEL ADDITIVES.

As water content increases and/or other practical use factors such as optimal cetane, flashpoint, or vapor pressure are considered, middle alcohols C6-12 and most preferably C8-10 or 2ethyl hexanol, are judiciously added to meet these specifications.

Alcohols having 8-10 carbon atoms have been shown to be especially effective in enhancing microemulsion stability, reducing evaporation rate, and improving power output of the fuel composition.

It is important, however, that the ethylene oxide level is not present - because ethylene oxide add on compounds - while not an actual flame retardant - do not burn well. High ethoxylate add-on concentrations produce very significant increases in particulate emissions. Therefore, its use, is outside the present invention, and will probably be limited to short-term applications where excessive ambient water condensation is eliminated, and 'lighter' versions of the fuel composition can then be effectively applied.

NO WAIVER OR ESTOPPEL

Applicant expressly asserts on the record that the amendments and arguments made in

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this application are for the purposes of obtaining a U.S. patent to one or more embodiments of this invention. The business climate is that to proceed commercially with this technology a U.S. patent needs to be issued. Applicant does not waive any rights to prosecute for broader claim coverage based on the originally filed application, claims or figures.

Applicant is not estopped from prosecuting in subsequent continuing applications for broader claim coverage than is found in the present claims, i.e. claim coverage commensurate with the originally filed specification, claims and figures.

REJECTIONS OF CLAIMS 1, 59, 60, 62-64, 66-68, 70-71 AND
73-76 UNDER 35 U.S.C. 103(a)

Claims 1, 59, 60-64, 66-68, 70, 71 and 73-76 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wenzel et al. (U.S. Patent 4,083,698)

The Examiner states that:

"Wenzel et al. U.S. Patent 4,083,698, teach liquid fuel compositions comprising a mixture of hydrocarbons, such as gasoline, diesel fuel, or fuel oil; water, preferable a water-soluble alcohol; and a combination of surface-active agents (column 1, lines 19-24). The fuel composition has a viscosity similar to that of a hydrocarbon fuel itself (column 2, lines 63-65). The combination of surface-active agents comprises (1) a long-chain fatty acid salt, or, more preferably an ammonium or sodium long-chain fatty acid salt, or mixtures thereof; (2) a free unsaturated long-chain fatty acid; and (3) a non-ionic surfactant typified by ethylene oxide condensation products and esterification products of a fatty acid with ethylene oxide (column 3, lines 30-38). Although oleic acids is most preferred, both as the free acid, and in combination with the ammonium and sodium hydroxide to form the salts, other unsaturated acids having from about 12-18 carbon atoms, such as linoleic may be used as well as mixtures of these acids. Also, saturated long-chain fatty acids having from about 12-18, such as stearic palmitic, myristic or lauric acids or mixtures thereof, may be used in combination with greater amounts of unsaturated acids (column 3, lines 49-52). The ethylene oxide condensation products which may be used include fatty alcohols having 12 to 18 carbon atoms (column 4, lines 7-38). Although methanol is preferred, the other water-soluble alcohols, such as ethanol, isopropanol, and mixtures of these, can be used (column 5, lines 54-56). While the amount of surface active-agents required must depend on the amounts of water and alcohol used in the fuel compositions, it is generally preferred that the ratio of the condensation products to the ammonium and/or mixture of ammonium and sodium salts of the saturated or unsaturated long-chain fatty acids be in the range of 1:2 to 3:1 by weight (column 5, line 66 to column 6, line 4). The alcohol can be added as a solution in water or it can be added separately (column 8, lines 10-13). Column 17, lines 15-19, teach that the addition of either ethanol or isopropanol stabilized emulsions at -24°C and that water or methanol could be added by neither one of those stabilized the emulsion unless ethanol or isopropanol was also added.

While Wenzel et al. differ from the instant claims in not requiring the presence of both ethanol and a straight or branched chain alcohol having between 3 and 5 carbon atoms, it would have been obvious to one having ordinary skill in the art at the time the

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invention was made to include both ethanol and isopropanol in a fuel composition as taught by Wenzel et al because Wenzel et al specifically teach that mixtures of alcohols may be used."

Applicant's arguments and declaration filed March 22, 2001 have been fully considered (by the Examiner) but they are not persuasive.

The Examiner states that the Applicant argues:

[t]he first and most apparent problem concerning the Wenzel et al patent especially as it relates to diesel fuel/other distillate fuels is its lack of lower alcohols C4-C5, and especially its lack of middle alcohols C6-C12.

Without the presence of these alcohols, especially the C8 alcohols, the invention relies entirely on ethoxylated alcohols and neutralized fatty acids for its surfactant portion, necessitating a high concentration of both in order to produce a stable total fuel composition. (REMARKS, page 11).

The Examiner states that the Applicant's argument lacks merit.

Applicant's claims do not require a C4-C5 or C6-C12 alcohol. Additionally, claim 1, the only independent claim, employs the transitional term "comprising". In using the transitional word "comprising," applicant renders the claimed composition open to the presence of additional, unrecited materials. *In re Baxter*, 656 F.2d 679, 686, 210 USPQ 795, 802 (CCPA 1981). Accordingly, applicant's claims do not exclude the ethoxylated alcohols of Wenzel et al.

Applicant respectfully traverses this rejection.

The essential elements of the Wenzel et al. patent are: liquid fuel compositions comprising diesel fuel and:

- a. water (0.1-25% by weight of total fuel)
- b. a water-soluble alcohol (C1, C2, C3)
- c. an ammonium or sodium fatty acid salt, or combinations thereof
- d. a free unsaturated long-chain fatty acid (oleic or linoleic), and
- e. a NO non-ionic surfactant as an ethoxylated fatty alcohol (EO mole value: 5-20)

The significant difference between these formulation and those outlined in the present invention is the discovery that a stable microemulsion can be produced without prior subpart (d).

The Wenzel et al. reference U.S. Patent No. 4,083,698 is cited and was overcome in Applicant's equivalent PCT application.

While Wenzel et al. '698 include ethanol in the fuel compositions of that invention, nowhere is there teaching or suggestion of useful formulations in which ethylene oxide add-on components are absent.

While Wenzel et al. teach that isopropanol is effective in improving microemulsion stability of formulations where water, methanol, ethanol, a non-ionic surfactant, and partially neutralized fatty acids are present, it was not obvious that isopropanol, as a component, could be

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used to effectively produce a stable micro-emulsion when only ethanol, isopropanol, and partially neutralized fatty acids are present with water and methanol present at about 5% or less by volume of ethanol. The ethoxylated condensation products are excluded.

One specific aspect of the present invention is that it is possible to produce a stable microemulsion using only ethanol, isopropanol, and partially neutralized fatty acids; provided that water and methanol content remain at about 5% by volume of ethanol or below.

As stated throughout the specification, C8-10 alcohols, and especially both branched and straight-chain C8 alcohols, are most effective in producing clear, stable microemulsions in the presence of water, ethanol, and partially neutralized fatty acids.

However, stable microemulsions can be effectively produced using combinations of alcohols that include lower alcohols such as isopropanol, iso-butanol, and 2-ethyl-hexanol and their straight-chain equivalents as well as small quantities of C10-12 alcohols.

Therefore, an important quality of the invention is that combinations of isopropanol, C4-5 alcohols, and C6-12 alcohols are effective in producing stable micro-emulsions with ethanol and partially neutralized fatty acids where water is present up to 25% by volume of ethanol and without the use of subcomponent (d).

The present invention and present claims differ significantly from Wenzel et al. in that in this invention isopropanol is used as an effective co-surfactant with ethanol and partially neutralized fatty acids with no subpart (d) present, provided water content is at about 5% by volume of ethanol, OR isopropanol can be used in combination with other alcohols such as C4, C5, C6, C8, C10 and C12, and especially with C8 alcohols with no non-ionic surfactant present to produce stable micro-emulsions when water content increases up to 25% by volume of ethanol.

Without the presence of the subpart (b) alcohols, especially the C8 alcohols, the invention relies entirely on ethoxylated alcohols and neutralized fatty acids for its surfactant portion, necessitating a high concentration of both in order to produce a stable total fuel composition.

A fuel composition with a concentration of neutralized fatty acids leaves an unacceptable residue in fuel system and internal engine parts.

A fuel composition with a concentration of ethoxylated alcohols will adversely affect combustion because ethylene oxide add-on compounds do not burn well. A high enough concentration of ethylene oxide add-on actually increases exhaust smoke, which conflicts directly with the objective of the invention to reduce pollution.

Also, both neutralized fatty acids and ethylene oxide add-on alcohols are extremely viscous compared to the viscosity of fossil fuels. Too high a concentration of either or both will

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adversely affect the viscosity of the total additive composition, which must match as nearly as possible the viscosity of the original fuel in order to be useful in existing fuel systems and engines.

The presence of lower alcohols (C4-5) and middle alcohols (C6-12) and most especially middle alcohols (the C8 alcohols) in the present invention make it possible to greatly reduce the proportion of neutralized fatty acids needed to produce a stable fuel composition and to even further reduce or eliminate the need for ethoxylated alcohols.

Without the inclusion of middle (C6-12) alcohols, which have been shown to greatly reduce evaporation levels of lower alcohols (C1-2), while ethoxylated alcohols and neutralized fatty acids did not reduce evaporation levels, a defect of the Wenzel et al patent is that additive compositions of this invention will produce unacceptable levels of methanol/ethanol vapors.

Applicant argue that with the present amendments that Wenzel et al. '698 would only lead one of skill in the art away from the present invention, not toward it.

Based on these amendments and arguments, Applicant argues that this rejection is overcome and request that it be reconsidered and withdrawn.

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SUMMARY

Based on the above arguments and amendments, Applicant argue that these claims are now of a form and allowance. A prompt notification thereof is respectfully requested.

IMPORTANT

IF THE EXAMINER HAS ANY QUESTIONS, PLEASE CALL THE UNDERSIGNED AT 650-324-1677 X 20 AS SOON AS POSSIBLE. APPLICANT WILL CONSIDER ANY EXAMINER'S AMENDMENTS OR SUPPLEMENTAL AMENDMENTS WHICH WILL MOVE THIS APPLICATION FORWARD TO ISSUE.

The Examiner is authorized to charge or credit PTO Deposit Account No. 16-1331 for any needed expense in the filing of this response.

Respectfully submitted,

Date: July 9, 2001

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Enclosures:

- Clean Claims
- Clean paragraphs for the specification
- Webster's Dictionary p. 369

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